NOTES ON ECUADORIAN BUTTERFLIES, V

By F. Martin Brown

CITHÆRIAS, HÆTERA AND PSEUDOHÆTERA N. G. (SATYRIDÆ)

The species that compose these genera are usually met with in Ecuador in the cool dark of the tropical and subtropical jungle. Their flight is close to the ground and slow, but erratic in its course. They have the tantalizing habit of lazily drifting down the trail a few feet in front of you only to fade into the underbrush at the sweep of a net. Their transparent forewings, the delicate colors and the bold ocelli on the outer margin of the hindwing combine to present the eerie impression of disembodied eyespots gayly wandering through the forest. Although *P. hypæsia* Hewitson is much the most common species in our collections it is probably no more common than most of the species in nature. It seemed to show more preference for open glades and broad trails than did the others and therefore more frequently fell prey to the collector's net. Weymer says of the genus *Cithœdias* (as *Callitæra,* Seitz' V, p. 174) that it is particularly fond of the early morning hours for flight. I cannot remember that they were any less frequent at midday or in the afternoon. Their habits may be different along the Atlantic seaboard where the midday and afternoon is so much warmer than in the upper Amazon forest and Andean foothills.

Key to the Neotropical Transparent Winged *Satyridæ*

1a. M_3 and Cu_1 of the hindwing connate 2
b. These veins with clearly separate origins ..... *Cithœrias* 5
2a. Outline of outer margin of hindwing angular ..... *Hætera* 3
b. Outline of outer margin of hindwing not angular ..... *Pseudohætera hypæsia*
3a. A strong yellow flush on the outer half of the hindwing ..... *H. piera* & ff. 16
b. This flush absent 4
4a. Outer margin of hindwing red or reddish at least in the angle ..... *H. macleannania* & ff. 19
b. No red on the hindwing ..... *H. diaphana*
5a. Hindwing with pink or red scaling, occasionally red-lilac; no blue or deep violet scales 6

b. Hindwing principally blue or violet scaled, or brownish tan lacking any pink 10
6a. A distinct brownish or deeper pink submarginal line on hindwing 7
b. Hindwing with a broad brownish marginal band (see figure) *C. menander*
7a. Hindwing with three transverse lines, submarginal, limbal and discal: limbal line nearer the discal than submarginal on anal margin (see figure) ..... *C. pireta*
b. The three lines about equidistant (see figure). Forewing with two brownish transverse lines 8
8a. Pink of the hindwing not entering the cell 9
b. Pink of the hindwing entering the cell ..... *C. aurorina*
9a. Pink of the hindwing bold, often lilac-pink ..... *C. aurora*
b. Pink of the hindwing weak, usually rosy pink ..... *C. phantoma*
10a. Hindwing with blue or violet scaling 11
b. Hindwing lacking blue or violet scaling 15
11a. Three large pink spots surrounded by deep violet on the margin of the hindwing ..... *C. pyropina*
b. Otherwise ..... *C. philis* & ff. 12
12a. An ocellus or a pinkish white spot between Cu_1 and Cu_2 *C. p. esmeralda* & ff. 13
b. This ocellus or spot lacking ..... *C. p. philis*
13a. A single ocellus posterior of the normal anterior ocellus *C. p. harpalyce*
b. Two ocelli or pinkish white spots flanking the Cu_2 14
14a. Two ocelli ..... *C. p. esmeralda*
b. Two pinkish white spots ..... *C. p. esmeralda* f. *bandusia*
15a. Transverse band of the hindwing connected with the margin by broad brown stripes on the veins ..... *C. p. philis* f. ♀ *pellucida*
b. Transverse line of the hindwing not so connected ..... *C. polita*
16a. ♂ anterior ocellus of hindwing lacking ..... *H. piera* f. *unocellata*
♀ anterior ocellus the smaller ..... *H. piera* f. *unocellata*
b. ♂ two ocelli, ♀ anterior ocellus the larger 17
17a. No red at margin of hindwing, transverse band obsolescent *H. p.* f. *negra*
b. Red at margin of hindwing 18
18a. Transverse bar over posterior ocellus only slightly basad, ♀ with little or no submarginal red ..... *H. piera* f. *piera*
b. This bar markedly basad, ♀ with submarginal red extending to the transverse band ..... *H. piera* f. *ecuadora*
19a. Transverse band obsolescent between M_3 & Cu_2 on the hindwing *H. m. macleannania*
b. This area of the band bold ..... *H. m. laddeya* 20
20a. ♀ with normal red submarginal area on hindwing ..... *H. m. laddeya*
b. ♀ lacking red submarginal area on hindwing *H. m. laddeya* f. ♀ *neglecta*

An examination of the male genitalia of these insects at once shows that there are four groups into which the aggregate may be divided on that basis. For two of these groups valid names are available, *Cithærias* and *Hætera*. Of the former genus *polita* is aberrant and of the latter *hypæsia*. In the following discussion these will be mentioned by the specific name. I will use *aurorina* as model for *Cithærias* and *piera* for *Hætera*.

Venation: Forewing. There are several variable factors on this wing. The dilated portion of the subcosta extends about 0.6 of the length of the cell in *piera* while in the other three it is much less. It is 0.4 for *aurorina* and *polita* and only 0.33 for *hypæsia*. The first and second radial branches are emitted before the end of the cell in all four. In *piera* and *polita* the R_2 is emitted about half way from R_1 to the end of the cell; in *piera* it is emitted about two-thirds of the distance from R_1 to the end of the cell while in *hypæsia* it is emitted only one-third the distance from R_1 to the end of the cell. The first branch of the median has its origin on the R_s just beyond the end of the cell in *aurorina* and *polita* and at the end of the cell in *piera* and *hypæsia*. There is no evidence of recurrent veins in the cell of either *aurorina* or *polita;* in the cell of both *piera* and *hypæsia* there are faint traces of three recurrent veins extending from the base to the discocellulars, two of these end in the vicinity of the weak angle of the LDC the other on the R_s near the end of the cell. At the base of the wing there is evidence of a recurrent vein looping back from the A. This is fully developed in *piera* and only partially so in the others, being least well developed in *hypæsia*. A true costal vein is present in *piera*. It is free from the SC throughout. It extends almost to the end of the cell. There is a short costal vein in *hypæsia* and possibly one following the costal margin of the SC for a short distance in *polita*. No trace of such vein is present in *aurorina*. The basal portions of the wings of the four species are figured as is the cell of *hypæsia*.

Hindwings. The classical character for separating *Cithærias* (*aurorina* and *polita*) from *Hætera* (*piera* and *hypæsia*) is found on these wings. In the latter "genus" the M_3 and Cu_1 are connate, in the former their origins are well separated. The faintest traces of three recurrent veins are present in the cells of all four.

These veins are most marked in *hypæsia*. Most descriptions of the two genera, *Cithærias* and *Hætera*, mention what Schatz and Roeber call a precostal cell. In all four groups this is present. It is formed by the SC and Rs which are free at the base. The SC bows away from the Rs and again approaches it near the costal margin. In *aurorina*, *polita* and *piera* the two veins are joined by a very short cross vein, probably R_1. In *hypæsia* there is evidence of this cross vein in the form of a few small plates of chitin. The humeral vein is present in *piera*, represented by a slight chitinization in *hypæsia* and totally absent in *aurorina* and *polita*. The basal portions of the wings of the four species and the cell of *hypæsia* are figured.

THE HEAD: ANTENNÆ. None of the four has a strongly developed club on the antenna. It is best developed on *piera* and least well developed on *polita* (see figures). The antennæ segments number 45 on *aurorina*, 53 on *polita*, 44 on *piera* and 48 on *hypæsia*.

EYES: The eyes are glabrous on all four species.

TONGUE: The tongue of *polita* is noticeably shorter than that of the other three.

PALPI: There is some slight variation in the palpi. In general though they are the same. The distal segment is the shortest and the middle segment the longest (see figures).

PROPORTIONAL LENGTHS OF THE SEGMENTS OF THE PALPI

	Basal	Middle	Distal	Relative length
aurorina	0.22	0.68	0.09	1.00
polita	0.22	0.64	0.14	0.92
piera	0.22	0.60	0.17	0.82
hypæsia	0.24	0.63	0.13	0.86

THORAX: TEGULA. The tegulæ of *aurora*, *polita* and *piera* are very much alike. That of *hypæsia* is heavier and differently shaped (see figures).

PROTHORACIC LEGS. In both sexes the prothoracic legs are atrophied. In the males the tarsus consists of a single joint. In the females the tarsus is made up of five parts. The proportional lengths of the parts of these legs is presented in the following table.

Males

	Femur	Tibia	Tarsus	Relative length
aurorina	0.34	0.36	0.30	1.00
polita	0.36	0.42	0.22	0.75
piera	0.41	0.43	0.16	0.98
hypæsia	0.36	0.36	0.28	0.95

Females

	Femur	Tibia	Tarsus	Relative length	♂ = 1.00
aurorina	0.41	0.31	0.28	1.00	1.33
polita	0.43	0.30	0.27	1.12	2.00
piera	0.41	0.30	0.29	1.32	1.79
hypæsia	0.41	0.32	0.27	1.07	1.50

In every instance the proximal tarsal joint in the female is greater than 50 per cent of the total length of the tarsus; *aurorina* 0.60, *polita* 0.62, *piera* 0.64, *hypæsia* 0.61. The sequence of the lengths of the joint is the same in all four species. In descending order they rank 1, 2, 5, 3, 4. Thus the joint next to the distal is the smallest in every case.

Male genitalia: Uncus. Except in *piera* and its congenors this structure is simple, long and slender. In *piera* it is short, stocky and deeply bifurcate.

Tegumen: Shows no characters of generic value.

Vinculum: Shows no characters of generic value.

Saccus: Very long in *piera*, moderately long in *aurorina* and its strictest congenors, very short in *polita, menander* and *hypæsia*.

Valves: These parts are highly variable and form an excellent basis for specific determination but are not of value for generic separation.

Ædæagus: The *piera* group may be instantly recognized by the large size and curiously curved character of this structure. The rest of the species divides into two groups identical with the division based on the saccus. The *aurorina* group has an ædæagus that is long and tapers from a broad proximal portion. The organ in *polita, menander* and *hypæsia* is short and more or less uniform in its diameter throughout.

In recapitulation it seems to me that in the four groups we have three genera—*Cithærias* is represented above by *aurorina* which is strictly congeneric with the genotype *pireta; Hætera* is repre-

sented by its genotype *piera;* and *hypæsia* which throughout the structural discussion has been seen to differ from *piera* to an incompatible degree. For this species I am proposing a new generic name. I believe that *polita* had best remain in *Cithærias* for the present. It is by no means a true congenor of *pireta* but it is linked to the red winged *Cithærias* through *menander* on a structural basis. If I favored subgenera I would not hesitate to erect one for it, but I don't.

CITHÆRIAS HÜBNER

[1819]. Verz. bek. Schmett., 53.

Type: *pireta* Cramer = *andromeda* Huebner nec Fabricius (1775).

Synonyms: *Callitæra* Butler, Cat. Sat. B. M., p. 101, 1868.
Hetaira Bates, Nat. River Amazon, Clodd ed., p. 52, 1892.
Cythærias Weymer, Stübel's Reise, Lepid., p. 53, 1890.

The validity of the name for this genus is a little involved. In 1807 Fabricius erected the genus *Hætera* for a group of hyaline winged butterflies (Illiger's Magazine, 6: 284, 1807). This genus was not homogeneous, in fact it contained material drawn from both the *Satyridæ* and *Ithomidæ*. Two species were mentioned, *piera* a satyrid and *diaphanus*[1] an ithomid; in addition the author noted that there were sixteen other species to be included. In [1819] Huebner erected the genus *Cithærias* for *piera, cissa, andromeda* and *nereis* (Verz. bek. Schm., p. 53). He also included *philis* and *pireta* Cramer as synonyms of *cissa* and *andromeda* respectively. In the light of modern taxonomy this genus too is not homogeneous but all of the species are *Satyridæ* and are closely related.

In the first really serious attempt to organize the genera of butterflies (Doubleday, Westwood & Hewitson, Gen. Diurn. Lep.) is found an interesting treatment of these insects. As genus IX of the *Satyridæ* Westwood lumped together as *Hætera* the species now recognized as five different genera. Westwood made two divisions of his encompassing genus: Divisions A and B. Of these all of the species with hyaline wings were included under

[1] Genotype of *Hymenitis* Huebner (Scudder).

the first section of division A. This section is noted "Section 1. Wings hyaline (*Hætera* proper, *Cithærias* Hübner)." It in turn is divided into two subsections, a, and b. Subsection a. contains only *piera* Linnæus, one of the species in the original list of species in *Hætera*. Subsection b. contains *andromeda* and *esmeralda*. This action has been interpreted by Butler and later by Godman and Salvin, and Weymer as indicative of synonymizing *Hætera* and *Cithærias* by Westwood. With this I cannot agree. Two genera are synonymous only if they have the same type species or if their type species are congeneric in the strictest sense. In fact no genus is valid unless it is monotypical in its original description, or has had a type designated for it selected from the series of species included in the original description or list of species included within the original genus. Westwood designated no types for these generic terms.

In 1868 Butler (Ent. Mo. Mag., 4: 195, 1868) noted under his second division of the *Satyridæ* "Genus 3. *Gen. Nov.* allied to *Hætera*" and in a footnote to this "This genus includes *esmeralda* and *aurora* groups." Later in that year in the Cat. Sat. B. M., p. 101, he named this genus *Callitæra* and included *menander, aurora, esmeralda, harpalyce* and *andromeda,* but failed to designate a type for the genus. However, on the following page, 102, he does fix the type of *Hætera* as *piera* Linnæus. This is the earliest genotype fixation in the group of genera included under *Hætera* by Westwood.

In 1874, Scudder (Proc. Amer. Acad. Arts and Sci., 10, 1874) pointed out that *Callitæra* (p. 131) is synonymous with *Cithærias* (p. 143) and designated *andromeda* as the genotype of the latter genus but fixed no type for the former. This validates *Cithærias* from 1874 for use with the species herein included.

In using *andromeda* "Fabricius" as the genotype it must be realized that that species is somewhat obscure. Fabricius' original description distinctly indicates that the name was to be applied to one of the forms with blue on the hindwings. (Syst. Ent., p. 467, no. 107, 1775). That he decidedly confused things by writing an amended description twenty-two years later (Ent. Syst., 3: 184, n. 569, 1793) does not alter this. This interpretation of the facts allows only one conclusion, that *esmeralda* Doubleday (Ann. Mag. Nat. Hist., 16: 306, 1845) is a synonym

of *andromeda* Fabricius (Syst. Ent., 467, no. 107, 1775). That the amended description includes what is now known as *menander* Drury (Ill. Ex. Ent., 3: pl. 38, f. 3, 1782) is quite probable and so in part *andromeda* Fabricius (Ent. Syst., 3: 184, no. 569, 1793) is a synonym of *menander*. Since Scudder (*l.c.*) cited *andromeda* Fab. as the type of Huebner's genus *Cithœrias* it is important to know which of these two interpretations was placed upon the name by Huebner. In the Verz. bek. Schmett., p. 53, Huebner places *pireta* Cramer as a synonym of *andromeda* Fabricius. Although he cites the 1775 reference to the Fabrician name, it is obvious that he had in mind the rose flushed species as figured by Cramer. Thus Scudder's designation of *andromeda* "Fabricius" as interpreted by Huebner as the genotype of *Cithœrias* actually is the designation of *pireta* Cramer for that position.

This change in the name of the genotype may seem contrary to Opinion 65 of the International Commission on Zoological Nomenclature and may indeed need their action. I do not think that they can decide other than I have. However, I have presented the problem to them for final decision.

I have been unable to discover any fixation of type for *Callitœra* Butler. In order definitely to relegate *Callitœra* Butler to the synonymy of *Cithœrias* I now designate *aurora* Felder, a species listed by Butler in the original group of species called *Callitœra,* as its genotype. This species is the one most closely allied to *pireta* Cramer included in Butler's list of species for *Callitœra.*

Five forms of the genus fly in Ecuador, two are found on the Pacific slope in the Colombian Pacific division of the humid tropics and three in the eastern Andean foothills of the humid subtropics and the Amazonian jungle.

There are three red marked *Cithœrias* found in Ecuador. On the west coast the Central American species *menander* Drury is abundant. In the tropical forest at the foot of the Cordillera Oriental *aurora* Felder and Weymer's *aurorina* are found. Since Weymer seems to have been a little confused about these red forms when he wrote the account of the genus in Seitz' (5: 174–175) perhaps it would be well to set down my own conclusions at this time. Apparently there are two red marked "species" that fly in the Amazon basin. They can be separated by the dark

transverse lines on the hindwing. One of them has the middle line, the limbal line, nearer to the discal line than to the submarginal line. The earliest name that is clearly available for this "species" is *pireta* Cramer. (Pap. Exot., pl. CCCLXX, fig. E.). Weymer's figures of "*pireta*" in Seitz' (5: pl. 42a, 3rd & 4th figures) represent *aurora* Felder which is the earliest name clearly available for the "species" with equidistant lines on the hindwing. The number of dark transverse lines is not constant, however *pireta* usually shows only one while *aurora* and its forms usually show at least traces of two.

Fassl's *rubina* is a synonym of *pireta* Cramer. Fassl created his synonym by following Weymer's diagnosis of *pireta* which unfortunately is incorrect. It is fairly obvious from Weymer's discussion of *pireta* and *aurora* plus his figure of "*pireta*" and *aurorina* in Seitz that his "*pireta*" and *aurora* are synonymous. This led Fassl to re-name the "species" from the southern lower Amazon basin *rubina*. If he had waited until he had Cramer's volumes to consult instead of sending his description in from the field he would not have made this error. Cramer's figure clearly shows the red scaling restricted to the area between M_3 and Cu_2 as on *rubina*.

I have seen Fassl's *phantoma* (Ent. Zeit., Frankfurt, 36: 22, 1922) and it seems to be merely a very pale or faintly colored *aurora*.

The following table presents the differences and similarities of the four pink *Cithærias* found in the Amazon Basin.

	pireta	*aurora*	*aurorina*	*phantoma*
No. transverse lines on forewing	Usually one, rarely two	Usually at least a trace of second	Two	Usually at least a trace of second
Limbal line on h.w. nearer basal than submarginal	Yes	No	No	No
Red scale not reaching cell	Usually just touches cell occasionally not	Always short of cell	Always nearly to base of wing	Rarely beyond limbal line
Color of red scales	Rose-red	Plum	Rose-red	Rose-red
Male genitalia: distal process	Heavy, curved, occasionally hooked*	Heavy, curved	Light,* curved	Heavy, curved

Male genitalia: valve fold	Present	Present	Present	Present
Male genitalia: subscaphium	Present	Present	Present	Present
Male genitalia: tapered aedaeagus	Yes	Yes	Yes	Yes
Male genitalia: uncus/tegumen	1:1	1:1	1:1	1:1
Range	So. of Amazon & Marañon	N., N. W., & W. Amazon drainage	W. Amazon drainage	S. W. Amazon drainage

* The figures of *aurorina* (B1626) and *pireta* (B1703) show this difference in the valves.

Characters in common (range omitted):

	pi.	au.	aa.	ph.
pireta	×			
aurora	5	×		
aurorina	5	6	×	
phantoma	6	8	7	×

Thus it may be seen that *pireta* differs a little more from *aurora* and *aurorina* than from *phantoma* but that *phantoma* is closer to *aurora* and *aurorina* than to *pireta*. On the basis of pattern *pireta* stands alone; on the basis of color, *aurora;* on the basis of genitalia, *aurorina*. But none of these characters are really sufficient in view of the other species in the genus to be considered of specific value in any real sense. I feel that they are all forms of one biological species with a tendency to respond to its environment with slight morphological changes.

It has been suggested by Fassl (*l.c.*) and others that there is but one or at most two species among the colored *Cithærias*. Fassl suggests *menander* and *philis*. On the basis of genitalia *menander* (B1625) is immediately recognizable by the small size of the organs—all of the drawings presented are made to the same scale. Although there are many points of difference in the other species the most obvious and convenient for comparison are those found in the valves. Figures are presented for *philis* (B1711), *polita* (B1708) and *pyropina* (B1662) in addition to *menander, aurorina* and *pireta* noted above.

The problem of the blue *Cithærias* must await more material. I have seen no males of *andromeda* Fabr. (*esmeralda* Doubleday). All of the specimens that have passed through my hands have

been females. This is also true of *pellucida* Butler which I believe is a female form of *philis* Cramer. Butler in a footnote to his description of *harpalyce* (T. Ent. Soc. Lond., 1866, p. 42) states that *harpalyce* may be the other sex of *pellucida* which he described on the preceding page. Female specimens of *pellucida* and *philis* in the U.S.N.M. are remarkably alike except for the blue-violet scaling on *philis*. The two "species" were taken at the same locality.

C. menander Drury

1782. Ill. Exot. Ent., 3: pl. 38.

Synonym: *andromeda* Fabr. (in part), Ent. Syst., 3: 184, 1793.

Range: Nicaragua southward to western Ecuador.

Ecuador: Balzapamba, Bolivar, 630 m., 17 ♂♂ May–June '38 (W.C.-M.).[2] Playas de Juan Montalva, Los Rios, 30 m., 1 ♂ May '38 (W.C.-M.). Santo Domingo de los Colorados, Pichincha, 500 m., 4 ♂♂ Dec., Jan., Feb. '40–'41 (D.B.L.). La Lorena, Pichincha, 550 m., 3 ♂♂ Feb. '41 (D.B.L.). Rio Toachi, Pichincha, 800 m., 1 ♂ Nov. '39 (W.C.-M.). Palmar, Manabí, 200 m., 1 ♂ 6.v.41 (D.B.L.). Huigra (Rhoads, A.N.S.P.). Dos Puentes (Coxey, A.N.S.P.) "Cuenca" 4 ♂♂, 1 ♀ (R.P.M.). "Loja" 1 ♂ (R.P.M.).

These specimens differ a little from the Central American *menander*. The transverse brownish bar across the hindwing from M_3 to the anal angle is not quite so straight. However, this line is not so broad nor does it stagger as in *aurora* Felder. Another point of variance is the presence of a small white spot in the M_2–M_3 interspace. This seems to be absent in true *menander*. In *aurora* this spot and one in M_3–Cu_1 are present. Several of the specimens, one from La Lorena, one from Rio Toachi, and four from Balzapamba are inseparable from typical *menander*. Thus I am led to believe that the form under discussion is a slight variant of *menander*.

[2] The initials in brackets are of collectors of material in the Brown Collection, F.M.B. = Hazel H. & F. Martin Brown, J.E.S. = J. E. Schilling, W.C.-M. = William Clarke-Macintyre, D.B.L. = David B. Laddey; and of Museums from which I borrowed material, A.M.N.H. = American Museum of Natural History, A.N.S.P. = Academy of Natural Sciences, Philadelphia, R.P.M. = Reading (Pa.) Public Museum, U.S.N.M. = United States National Museum. A full description of the localities mentioned will be found in the Annals of the Entomological Society of America, Dec. 1941.

Drury's figure is of a female.

The male genitalia are smaller than those of *aurora* and show minor differences which may be seen by reference to the drawings.

This species is represented by material from Central America (as far north as Eden, Nicaragua (A.N.S.P.)) in the Academy of Natural Sciences, the American Museum of Natural History, the Reading Public Museum and the U. S. National Museum. In the Reading Public Museum are 19 specimens from various localities in Colombia, all on the west and north slope, and 11 from the Amazon Basin—6 ♂♂ Pebas, Peru, 3 ♂♂ Huaylas, Peru[3] and 2 ♂♂ Sao Gabriel, Upper Amazon, Brazil. These Amazonian specimens are the only ones that I have seen from the region. They are typical *menander* in pattern and genitalia. Since there is no pass in the northern Andes low enough for the passage of the species and since it has not been taken, to my knowledge, along the Orinoco I cannot see how the species entered this upper Amazon Basin. Because of this I question the validity of these Amazonas records. There is other questionable material of this genus in the same collection, specimens of *C. philis* ticketed Medina, Colombia and Chanchamayo, Peru.

The Ecuadorian specimens in the Reading Public Museum are from Mengel's collection and without much doubt were collected by Feyer. They certainly never came from Cuenca and Loja—two highland arid basins. Feyer's localities are notoriously inaccurate. The specimens were probably taken around Dos Puentes or Huigra where Feyer probably collected while enroute from his home in Guayaquil to Cuenca and Loja.

C. pireta f. *aurora* Felder

1862. Wien. Ent. Mon., 6: 175.

Synonyms: *pireta* Weymer nec Cramer, Stübel's Reise, p. 53, 1890.

pireta Weymer nec Cramer, Seitz' 5: pl. 42, line a, figs. 3, 4.

Type locality: Colombia.

Range: northern part of the Amazon Basin and Andean foothills of Venezuela, Colombia, Ecuador and northern Peru.

[3] There is a west slope town of the same name (Huaylas or Huailas) inland from Chimbote but it is too high for *Cithærias* (ca. 2700 m.).

Ecuador: Huagra-yacu, Napo-Pastaza, 900 m., 1 ♂ 31.iii.41 (W.C.-M.). Rio Arajuna, Napo-Pastaza, 1000 m., 2 ♂♂, 1 ♀ 26.iv.–1.v.41 (W.C.-M.). "Riobamba," 1 ♂, 1 ♀ (R.P.M.).

These four specimens from Macintyre come from the heart of the territory occupied by form *aurorina*. They are so distinctive that he thought he had a new species. The female approaches *pyropina* in coloration but the dark areas on the hindwing are not so deep violet, they are nearer to a light plum color. Apparently the stronghold of *aurora* lies in the northwestern part of the Amazon basin but specimens of it are found as far south as NE Peru. The Bassler collection in the American Museum of Natural History contains a specimen from the Rio Abujao, a southern tributary of the Marañon, that may be a female of *aurora* or *aurorina*, I cannot tell. It is much lighter than my Arajuno female and yet it seems too dark to be a typical *aurorina* female. Without males from the region I prefer to consider it *aurorina*. There are three Peruvian specimens in the Reading Public Museum from Pebas, Huaylas and Sana. The "Riobamba" pair noted above in the Reading Public Museum were probably purchased by Mengel from Feyer. The specimens must have come from the central west Oriente and certainly not from Riobamba, an arid, temperate station.

C. pireta f. *aurorina* Weymer

1910. Seitz' Macrolepidoptera, 5: 174; pl. 42, line a.

Synonyms: *aurora* Staudinger nec Felder.
andromeda Dognin nec Fabr. Lep. Loja, p. 8, 1887.
andromeda Dognin nec Fabr. Lep. Loja, p. 33, 1891.

Range: Upper Amazon as far west as the Andean foothills in Colombia, Ecuador, Peru and Bolivia.

Ecuador: Puyo, Napo-Pastaza, 1000 m., 7 ♂♂, 1 ♀ Dec. 1938 (F.M.B.). Rio Jondachi, Napo-Pastaza, 800 m., 3 ♂♂, 1 ♀ Nov. '39 (W.C.-M.). Sucua, Santiago-Zamora, 900 m., 2 ♂♂ 5.ii.39 (F.M.B.). Huagra-yacu, Napo-Pastaza, 900 m., 3 ♂♂, 3 ♀♀ 22.iii–4.iv.41 (W.C.-M.). Rio Arajuna, Napo-Pastaza, 1000 m., 2 ♂♂, 2 ♀♀ 24–30.iv.41 (W.C.-M.). Rio Jollin, nr. Archidona, Napo-Pastaza, 600 m., 1 ♂ 15.vii.41 (W.C.-M.). Sarayacu, Napo-Pastaza, 500 m., 2 ♂♂ vii.39 (Henderson). Macas (Santiago-

Zamora, 1050 m.) 1 ♂, 1 ♀ (R.P.M.). La Merced, below Baños, Rio Pastaza (Coxey, A.N.S.P.). Rio Pupuyacu (Macintyre, A.N.S.P.).

This is the predominant form of *pireta* south of Putamayo. It ranges into eastern Bolivia in the foothills. Males may easily be distinguished from those of *aurora* by the great extent of the rosy flush on the hindwings which almost reaches the base of the cell in *aurorina* and does not reach the cell in *aurora*. The color differs too. On *aurora* it is lilac pink, on *aurorina* rose pink. The females are equally easy to recognize. The limbal transverse line on the hindwings of *aurorina* is brownish while on *aurora* that portion caudad of M_3 is plum colored. South of the Amazon and the Marañon there are occasional specimens on which the pink scaling is greatly reduced. This is f. *phantoma* Fassl. The figure of the male genitalia (1626) is the extreme form found in the "species." Many specimens show almost the same valve structure as in *pireta* (1703).

C. pyropina Godman & Salvin

1868. Ann. Mag. N. H., (4)2: 141.

Type locality: Eastern Peru.

Range: Northeastern Peru and Southeastern Ecuador.

Ecuador: Macas (Santiago-Zamora, 1050 m.) 1 ♂ Jan. 1926 (R.P.M.).

This is the only Ecuadorian specimen known to me. It was probably collected by Feyer or the Olsens and sent to Mengel in whose collection it stands at the Reading Public Museum.

C. polita Hewitson

1869. Trans. Ent. Soc. London., 1869: 34.

Synonym: *Hippomene* Boisduval 1870.

Type locality: Chontales, Nicaragua.

Range: Nicaragua south to western Ecuador.

Ecuador: Santo Domingos de los Colorados, Pichincha, 500 m., 2 ♂♂, 2 ♀♀ Dec.–Mch. '40–'41 (D.B.L.). La Lorena, Pichincha, 550 m., 2 ♂♂, 3 ♀♀ Feb. '41 (D.B.L.). Palmar, Manabí, 200 m., 1 ♂, 2 ♀♀ Mch.–May '41 (D.B.L.).

Godman and Salvin give only the Central American range and knew of the species only from Nicaragua and Panama. Weymer

added Colombia and now Laddey has turned up the species in western Ecuador. It is improbable that its range will be extended further south. It does not seem to be so rare in Ecuador as elsewhere. It is interesting to note that in western Colombia the closely related species *mimica* Rosenberg & Talbot (T. E. S. Lond., 1913, p. 677) interrupts the continuity of the range of *polita* Hewitson. It is possible that Weymer's Colombian specimens represent *mimica* R & T. The pattern and wing form of this species is quite distinct from all others in the genus. This difference is borne out in the form of the genitalia of the males (B1708) and in many minor structural items. When the life histories are known for this group of insects it may be required that *polita* and *mimica* be divorced from *Cithærias*.

Boisduval in his "Considérations sur les Lépidoptèrés envoyés du Guatemala á M. de l'Orza," 1870, on page 62 states: "Hætera Hypæsia, Hewits. *Hippomene,* Bd. Deux individus de Nicaragua." This reference has been overlooked by Kirby although other species noted in the paper are given in the "Appendix" to his "Catalogue," by Godman and Salvin in the "Biologia" and its "Supplement," and by Gaede in the recent "Lepidopterorum Catalogus 29": *Satyridæ*. Since *hypæsia* does not occur in Central America and the only clear winged satyrid occurring there that might be confused with it is *polita* it is obvious that Boisduval was referring to that species. Thus we have as a synonym of *polita, hippomene* Bdv. I do not consider *hippomene* as a manuscript name or *nomina nuda* since it was published in such fashion that it might be recognized by a student of the group under discussion.

Hætera Fabricius

1807. Illiger's Magazine, 6: 284.
Type: *piera* Linneus (Butler, 1868).
Synonyms: *Oreas* Huebner [1807].
Pselna, Billberg, Enum. Ins., p. 77, 1820.
Hetæra, Butler, Cat. Sat. B. M., p. 101, 1868 (*et al.*).

Oreas was first used by Huebner in the *Tentamen* [1806] and subsequently in the Samml. exot. Schmett., 1, pl. (82) [1807]. Scudder's designation of (*proserpina* =) *circe* as the type does

not hold since Opinion 97, I.C.Z.N., declares the names in the *Tentamen nomina nuda* and therefore the genus *Oreas* must date from its next use. In the *Sammlung* it is used for *piera* which Hemming made its type in 1937. (Proc. R. Ent. Soc. Lond., (B)6: 152–153, 1937.) In the same paper Hemming points out that action taken by the I.C.Z.N., in 1935 considers the Fabrician name to have priority until precise dates regarding both Huebner's work and volume six of Illiger's Magazine are forthcoming. Thus *Oreas* Huebner may in time replace *Hœtera* Fabricius.

Hœtera piera Linneus

1764. Mus. Ulr. 220.

Synonym: ♀ *anacardii* Fabricius (*nec* Linneus), Syst. Ent., p. 467, no. 105, 1775.

Range: Amazon and Orinoco Basin and the Guianas.

H. piera (L.) is an extremely variable species. It differs from the following, *macleannania* Bates, in several minor respects other than in the form of the male genitalia. The most noticeable of these characteristic differences is the lack of yellow stain on the hindwings of both sexes of *macleannania*. Several names have been applied to various modifications of the basic pattern of *piera*. Those specimens lacking the anterior of the two ocelli are named *unocellata* Weymer. This is the only clear cut form of the species thus far described. There is a female in the collection of the U.S.N.M. collected by Dr. Wm. Mann at Tumupasa, Bolivia, that may be this form. While it does not lack the anterior ocellus that mark is greatly reduced and smaller than the posterior ocellus. The margin of the hindwing does not bear a distinct line but is smudged with brownish scales especially along the veins. The yellow stain on the hindwings of this form is greatly reduced. Weymer notes that the iris of the ocelli on the underside of this form is sulphur-yellow not red-yellow. This is true of the female noted above and also of various *piera*-forms from "Peru" (G. G. MacBean, U.S.N.M.), from Surinam (Wm. Schaus, U.S.N.M.), and several specimens noted from various rivers in eastern Peru (H. Bassler, A.M.N.H., F. Woytkowsky, F.M.B.) so I doubt that this can be used as a critical character.

The insect described as *diaphana* by Lucas in Sagra's "Historia de la Cuba," Lepid., p. 587, 1857, has been designated a form of

piera by Weymer (Seitz' 5: 175, 1911). In 1874 (P.Z.S., p. 337, 1874) Butler and Druce used the term for a male *macleannania* from Costa Rica in Druce's collection. Godman and Salvin (Biologia, Rhop., 1: 66, 1880) object to this on the basis of Lucas' stress upon the lack of red on the outer margin of the secondaries and the less angular outline of these wings when compared with *piera*. These two characters do separate Lucas' form from all of the specimens of *macleannania* that I have seen. Ten years after Lucas, Felder described *hymenœa* (Reise Novara, Lep. Rhop., 459, 1869) from Bahia, Brazil. This has been considered a synonym of *diaphana*. Unfortunately the only male of this insect that I have seen had been "restored" with a strange abdomen and I have not been able to prove or disprove a feeling I have that this is not a form of *piera* but a good species.

Felder described a form of *piera* as *negra* (Wien. Ent. Mon., 6: 176, 1862). This was from the Rio Negro, a northern tributary of the Amazon. The characters by which he set this form apart from *piera* are: ♂, the larger size, the obsolescences of the brown lines on the hindwings, a submarginal line and the total absence of red color from the margin of the hindwing; ♀, much more flexed and indefinite transverse band, the portion between the third median (Cu_2) and the internal vein (A) moved basad. This last statement in regard to the female is in error; the bar that is moved is Cu_1–Cu_2. I have seen this form from the Upper Ucayali, Peru (Bassler, A.M.N.H.), the Maroni River, B.G., and Surinam (Schaus, U.S.N.M.), Cayenne (Johnson, A.M.N.H.), various localities in British Guiana (Beebe, Lutz, etc., A.M.N.H.). Thus it seems to be fairly well distributed through the northern and western range of the species. The ten males that I have seen from the Rio Negro are typical *piera!* There is no difference between the genitalia of *negra* and *piera*. Thus I am led to believe that these two names designate the extremes of variation in typical *piera*. In general those specimens with well developed transverse bars more or less in a uniform line should be designated typical *piera* and those with an irregular obsolescent set of transverse markings, *piera* form *negra*.

Of Ecuadorian specimens Godman and Salvin (*l.c.*) state: "Of the races of *piera* in South America, that found in Ecuador is perhaps the most nearly allied to *H. macleannania*, as in it we find

the greatest development of red about the anal angle of the secondaries of the female. It (*macleannania*) has, however, the clear secondaries in common with the Brazilian *H. hymenæa,* and also the strongly marked band." It happens that in Ecuador both a form of *H. macleannania* and a form of *H. piera* are found that agree with the first sentence quoted above. However only the specimens of *macleannania* agree with the second sentence. The *macleannania*-like form of *piera* bears the characteristic yellow stain. This form is found at least as far east as Iquitos, Peru (F. Johnson, U.S.N.M.), as far south as Chanchamayo, Peru (B. P. Clark, U.S.N.M.), as far north as "Colombia" (F. Ovalle, A.M.N.H.) and west into the foothills of the Cordillera Oriental as high as Yungilla, Ecuador, 1400 m. (Coxey, A.N.S.P.). Bassler's extended series from the rivers tributary to the Marañon from the south in Peru does not contain this form. However, there is a good series in the Reading Public Museum from Juanguay, farther upstream on the Huallaga than any of Bassler's stations. With the exception of the Iquitos specimen all others come from regions above 500 m.—above the fall line. Thus I am inclined to doubt the veracity of that record. The specimen was probably collected by Klug who I know went far west of Iquitos and well into the zone in which this form flies. Intermediate specimens between it and typical *piera* are not rare in Surinam, Cayenne, British Guiana and the central Amazon basin north of the great river.

A larger series of specimens may prove that the material from north of the Amazon is truly separable from that found to the south. The major portion of the series (102 specimens) that I have before me are from the north and west and from it I can find no good reason for making such a division.

H. piera f. *ecuadora* n. f.

Type locality: Rio Tutenongoza, Sucua, Santiago-Zamora, Ecuador.

Range: Eastern foothills of the Andes from Central Peru to Colombia and eastward to the fall line.

Types: Holotype: a female, Rio Tutenongoza, Sucua, Santiago-Zamora, 850 m., Ecuador, 9.ii.39 (F.M.B.).

Allotype: A male, Puyo, Napo-Pastaza, 1000 m., Ecuador, 7.xii.38 (F.M.B.).

Paratypes: No. 1, a male, same date as Allotype. Nos. 2–6, 2 ♂♂, 3 ♀♀ Rio Jondachi, nr. Archidona, Napo-Pastaza, 800 m., Ecuador (W.C.-M.). No. 7, a male, Canelos, Rio Bobonaza, Napo-Pastaza, 700 m., Ecuador, 13.xii.38 (W.C.-M.). Nos. 8–9, 1 ♂, 1 ♀ Sarayacu, Rio Bobonaza, Napo-Pastaza, ca. 500 m., Ecuador (Coll. Wm. Schaus, U.S.N.M.). Nos. 10–11, 1 ♂, 1 ♀ Macas, Santiago-Zamora, 1050 m., Ecuador (Coll. E. W. Rorer, U.S.N.M.). No. 12, a male, "Ecuador" (Coll. F. Johnson, U.S.N.M.). No. 13, a female, Yungilla nr. Banos, Ecuador, 4000 ft. (Coll. W. J. Coxey ex Feyer, A.N.S.P.). No. 14, a male, La Merced, below Baños, Rio Pastaza, Ecuador, 4000 ft. (W. J. Coxey, A.N.S.P.). No. 15, 1 ♂ Macas, Jan. '26 (Coll. L. Mengel, R.P.M.).

Other specimens: 3 ♂♂ Macas, Jan. '26 (R.P.M.). 1 ♂ "Riobamba" (R.P.M.). 1 ♂ Huagra-yacu, Oriente, 900 m., 21.iii.41 (W.C.-M.). 1 ♂ Sarayacu, Oriente, 500 m., xii.39 (Henderson). 1 ♂ Rio Arajuno, Oriente, 1000 m., 1.v.41 (W.C.-M.).

This race differs from typical *piera* in the females, having the areas between the margin and the brown limbal transverse bars red or reddish-orange between veins A_1-Cu_2, Cu_2-Cu_1 and usually the posterior half of the area Cu_1-M_3 red. Occasionally all of this last area is red. These females differ from those of *macleannania* in having the usual yellow stain of *piera* and in that the red scaling rarely extends basad of the transverse bars but stops at those bars. The transverse bar in interspace Cu_1-Cu_2 is much more basad than the two flanking it on most specimens. This is another difference from typical *piera*. Thus *piera* seems to vary in three definite directions: 1st, toward obsolescence of the brown lines; this is especially noticeable in the males; 2nd, Cu_2–Cu_1 transverse bar on the hindwing migrates basad; 3rd, the development of reddish scales in the vicinity of the anal angle. This leads to eight possible combinations of the extremes:

A.—brown line fully developed; Cu_2-Cu_1 in line; no red.
B.—brown line fully developed; Cu_2-Cu_1 in line; with red.
C.—brown line fully developed; Cu_2-Cu_1 basad; no red.
D.—brown line fully developed; Cu_2-Cu_1 basad; with red.
E.—brown line obsolescent; Cu_2-Cu_1 in line; no red.

F.—brown line obsolescent; Cu_2-Cu_1 in line; with red.

G.—brown line obsolescent; Cu_2-Cu_1 basad; no red.

H.—brown line obsolescent; Cu_2-Cu_1 basad; with red.

Of these, condition A may be said to represent typical female *piera* from the Guianas; B is found in Colombia, Ecuador and Peru among the females; C is common in NE Peru among females taken with typical male *negra;* D is the usual condition in *ecuadora* females; E is found commonly among male *piera* from the Guianas; F I have never seen; G is typical of male *negra* and H is typical of male *ecuadora.* Thus the fully developed transverse brown line on the hindwing appears to be a female character, while the obsolescence of this line is a male character. Less than one per cent of either sex seems to bear the character of the opposite sex. The basad movement of the bar Cu_1-Cu_2 seems to be characteristic of the forms *negra* and *ecuadora.* The presence of this plus red on the margin of the wing may be taken as the key characteristic of *ecuadora.*

There is some variation in the extent of the opaque scaling on the margin of the hindwings of the females; it may be restricted to the A-Cu_2 area or extend from A to M_3.

It will be noted above that combination B is present in females and not in males—to my knowledge—and that it is nameless. To satisfy taxonomists I name this *H. piera ecuadora* female form *pseudopiera.*

H. p. f. *ecuadora* ♀ f. *pseudopiera* n. f.

Type locality: Macas, Santiago-Zamora, Ecuador.

Range: the same as for the parent form *ecuador.*

Type: Holotype, Macas, El Oriente, Ecuador, Jan. '26 (Mengel Coll., R.P.M.).

Paratype: No. 1, La Salud, Chanchamayo, Peru (Mengel Coll., R.P.M.). No. 2, Chiquita River Valley, Colombia (Mengel Coll., R.P.M.). No. 3, same as No. 1 (retained by F.M.B.).

This form differs from the typical in two points: the transverse bars just basad of the anal ocellus are in nearly a straight line and the red scaling is almost entirely restricted to the margin of the wing with only a scattering of scales in the A-M_3 interspaces.

I have seen a number of intermediate specimens but the fully developed form is quite distinctive.

Hætera macleannania Bates

1865. Ent. Mo. Mag., 1: 180.

Type locality: Lion Hill Station, Canal Zone.

Range: Honduras to central western Ecuador.

H. macleannania laddeya n. r.

Type locality: Hda. La Lorena, nr. Santo Domingo de los Colorados, Pichincha, Ecuador.

Types: Holotype: a male, Hda. La Lorena, nr. Santo Domingo de los Colorados, Pichincha, 550 m., Ecuador, 21.ii.41. (D.B.L.).

Allotype: a female, same locality as holotype, 8.iii.41 (D.B.L.).

Paratypes: Nos. 1–3, 2 ♂♂, 1 ♀ same locality, 25,28,28.ii.41 (D.B.L.).

This race differs from the typical insect in the boldness of its dark markings. The curved, V-shaped limbal band is very dark brown, almost black. It is particularly noticeable on the females. On typical female *macleannania* this dark band is practically absent from M_3 to Cu_2; on *laddeya* it is as heavy in this region as the conspicuous bar between Cu_2 and A_1 on *macleannania*. The difference between *piera* and *macleannania* noted above holds for *laddeya* and sets it apart from *piera ecuadora*. The angle on the hindwing of the males of *laddeya* does not contain so much red as on the males of the older named form and the red is terra cotta, not old rose. There is no valid difference between the male genitalia of *laddeya* (B1709) and *macleannania* from Panama. These organs of the males dispel any notion that the two species, *piera* (B1658) and *macleannania* are one.

This new race is named for its collector, David B. Laddey.

♀ f. *neglecta* n. f.

Types: Holotype: a female, same data as *laddeya*, 25.ii.41 (D.B.L.).

Paratype: a female, same data, 1.iii.41 (D.B.L.).

This interesting form lacks any touch of red on the hindwings and is easily confused with the males of the race. From the males it differs in that the dark markings are broader and the anal ocellus is bracketed above and below with patches of white scales that fill or almost fill the area between the dark markings and the ocellus. There are also diffuse patches of white scales in the basad

portions of the hyaline areas between the dark markings in the two interspaces flanking the anal ocellus.

Pseudohætera n. g.

Type: *Hætera hypæsia* Hewitson.

The markedly different male genitalia of *hypæsia* when compared with true *Hætera* makes it necessary to erect a new genus for this species. The venations of the two genera are essentially alike but in *Hætera* on the hindwing the SC and R_s are joined by a thick cross vein beyond the origin of the H. This connection between the SC and R_s beyond the H is absent in *Pseudohætera.* The wings of *Pseudohætera* are more rounded than those of *Hætera,* especially the hindwings which are quite angular in *Hætera.* The basic pattern of the maculation of *Pseudohætera* is closer to that of *Cithærias* than that of *Hætera.* The points of difference between *Hætera* and *Pseudohætera* have been set forth previously.

The differences between the male genitalia of *Pseudohætera* and *Hætera* are best seen in the drawings *1627* and *1658.* They may be summarized as follows:

Uncus: *Pseudohætera,* long, slender, simple.
Hætera, short, compact, deeply bifurcate.

Tegumen: *Pseudohætera,* deeper than long.
Hætera, longer than deep.

Vinculum: *Pseudohætera,* moderately slender and more or less uniform in width.
Hætera, broad and foliate at ventrum.

Saccus: *Pseudohætera,* short.
Hætera, long.

Valves: *Pseudohætera,* semi-quadrangular, dorsal margin delicate and irregular.
Hætera, semi-triangular, dorsal margin strong and armed.

Ædæagus: *Pseudohætera,* short, stocky, undulant: distal orifice nearly rectangular.
Hætera, long, stocky, proximal half a full reflexed curve 90° in one direction, then over 180° in the opposite direction; distal orifice on a long tangent.

Pseudohætera hypæsia Hewitson

1854. Trans. Ent. Soc. Lond., ser. 2, 2: 247, pl. 23, f. 2.

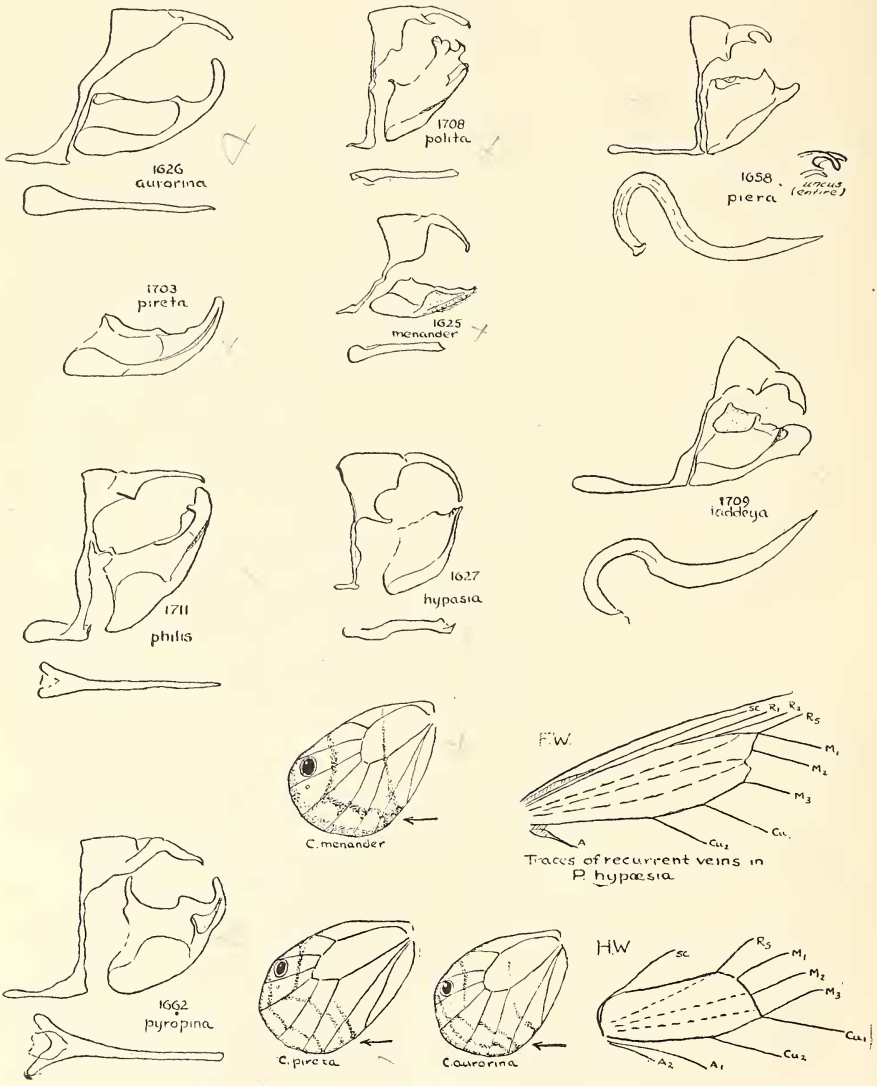
Type locality: Bogota, Colombia.

Range: Colombia to Bolivia in eastern foothills of the Andes and adjacent lowlands.

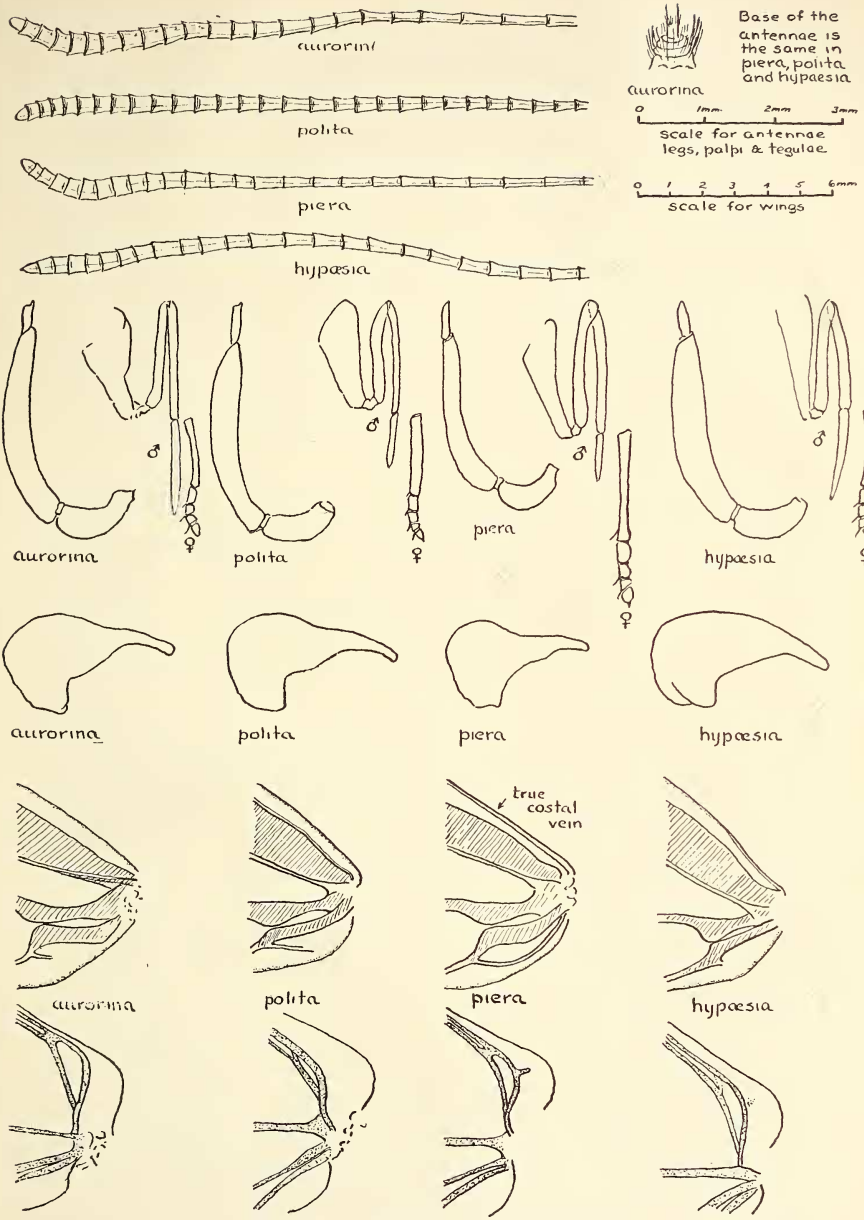
Ecuador: Hda. San Francisco, Tungurahua, 1300–1400 m., 9 ♂♂, 3 ♀♀ ix–39, iii–40 (F.M.B.). Hda. Chinchin Grande, Tungurahua, 1400 m., 1 ♂ x–39 (J.E.S.). Rio Margajitas, Tungurahua, 1250 m., 1 ♂, 1 ♀ ix–39 (F.M.B.). Hda. Sta. Inez, Tungurahua, 1250 m., 1 ♂ 29.ix.39 (F.M.B.). Hda. La Palmera, Tungurahua, 1200 m., 1 ♂, 1 ♀ xii–38 (W.C.-M.). Abitagua, Napo-Pastaza, 1300 m., 2 ♂♂, 1 ♀ v–vi.39 (W.C.-M.). Puyo, Napo-Pastaza, 1000 m., 8 ♂♂, 2 ♀♀ xii–38 (F.M.B.). bet. Macas & Rio Abonica, Santiago-Zamora, 1200 m., 1 ♂ 21.i.39 (F.M.B.). Huagra-yacu, Napo-Pastaza, 900 m., 2 ♀♀ 21.iii–8.v.41 (W.C.-M.). Bombaini-yacu, Napo-Pastaza, 900 m., 1 ♂ (W.C.-M.). "Loja," 2 ♂♂, 1 ♀ (R.P.M.). Macas (Santiago-Zamora, 1050 m.) Jan. '26, 1 ♂ (R.P.M.). Fortaleza, Oriente, 1 ♂ (R.P.M.). La Merced, Rio Pastaza, below Baños (Coxey, A.N.S.P.).

There is some variation in the markings on the underside of the hindwing. Some specimens are marked with black scales, others have a rufous marking bordered with black. There seems to be no relationship between these two forms and either sex or geographic area. I see no need for separate designations.

The "Loja" specimen noted above must have come from somewhere east of that city. Probably along the Rio Zamora or on the trail between Zamora and San Francisco, the pass through the eastern Andes east of Loja. The Fortaleza specimen comes from a region that lies far to the east of the area I have generally considered the range of this species. In the same collection (Reading Public Museum) are specimens from Pebas, Iquitos and Huaylas, all in Amazonian Peru. However, since the extensive Bassler collection made in Amazonian Peru does not contain this species from east of Moyabamba I am inclined to reserve judgment on the validity of the localities on this R.P.M. material.



ECUADORIAN BUTTERFLIES



ECUADORIAN BUTTERFLIES